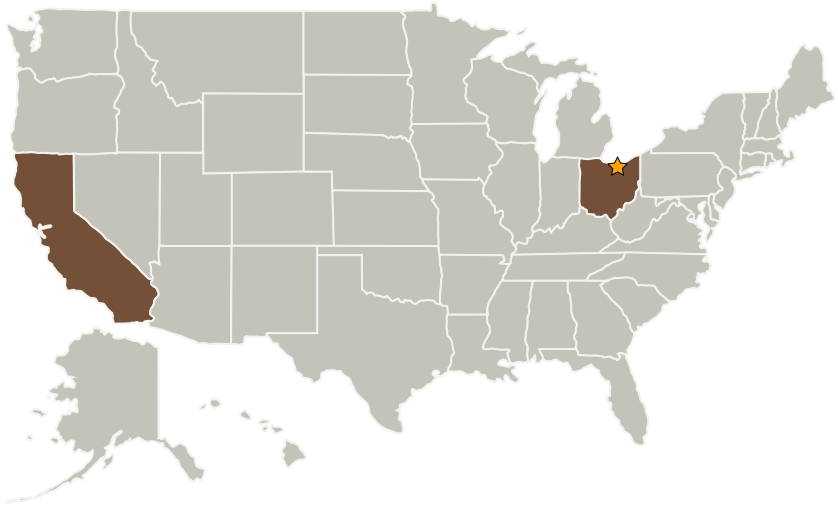
Aircraft Based Imaging Probe for the Study of Icing Environments, Phase I

Completed Technology Project (2004 - 2004)

Project Introduction

Icing environments are of great concern in commercial and military aviation. An aircraft-based, imaging probe is being proposed for the reliable and accurate measurement of liquid water content (LWC) and droplet size distributions in environments variously referred to as freezing rain, freezing drizzle, supercooled drizzle drops, and supercooled large drops (SLD). The innovative aspect of the proposed probe is the use of multiple laser beams (of differing wavelengths) to create high quality shadows of individual particles (droplets and ice crystals) on a 2-d CCD array. Conventional aircraft-based probes such as the OAP suffer from measurement uncertainties arising from the detection of droplets that are out-of-focus. The use of multiple intersecting laser beams will also minimize the background noise created by other particles that may be present along the laser beam path but outside of the measurement volume. Finally, the incorporation of a means for differentiating between ice-crystals and droplets, while counting and measuring both, allows computation of water content in both liquid and solid phases. These innovations, and the other features of the probe to be discussed later, directly address the need for aircraft-based icing monitoring systems that NASA has identified in topic A1.02 of the 2003 SBIR solicitation.

Primary U.S. Work Locations and Key Partners



Aircraft Based Imaging Probe for the Study of Icing Environments, Phase I

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

Aircraft Based Imaging Probe for the Study of Icing Environments, Phase I

Completed Technology Project (2004 - 2004)

Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Artium Technologies	Supporting Organization	Industry	Sunnyvale, California

Primary U.S. Work Locations	
California	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

William Bachalo

Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.3 Aero Propulsion
    - TX01.3.11 Engine Icing